Quarkonium TG Progress

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Upsilon Analysis

- The observable we plan to measure Y(1S), Y(2S), Y(3S) R_{AA} as a function of collision centrality and Y p_T.
- Signal statistical precision that translates directly into Y(1S), Y(2S), Y(3S) R_{AA} and depends on
  - ✓PID efficiency
  - ✓Combinatorial and Correlated Backgrounds
  - ✓Tracking efficiency and momentum resolution (well understood prior to Sept tracking review)

Background Issues

- Framework for inclusive background estimate existed and was modified to produce background plots as a function of “electron” pair pT. Progress reported regularly by Sasha Lebedev at simulations meetings https://indico.bnl.gov/categoryDisplay.py?categId=88

done

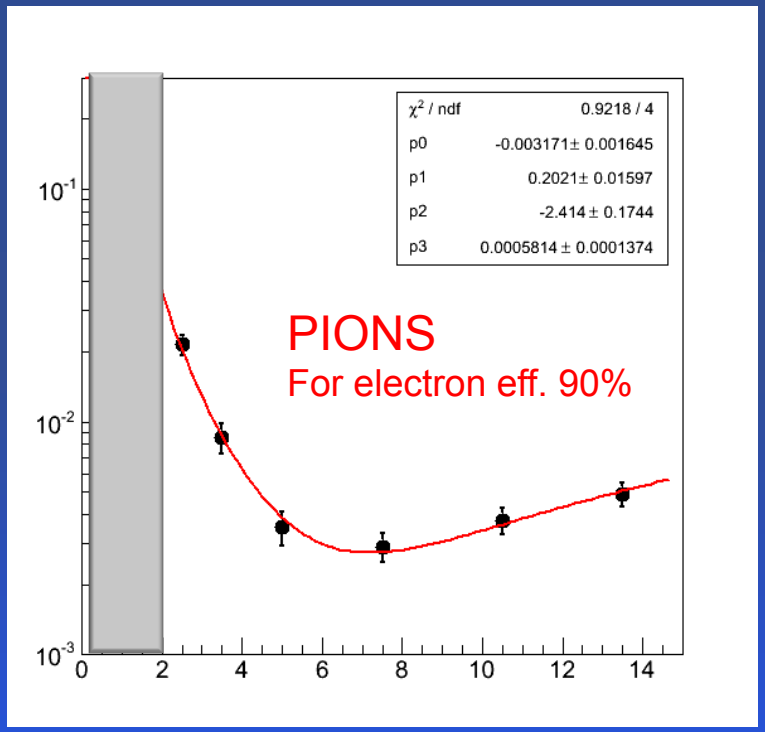
- ✓Determine with realistic clustering and detector configuration in central Au-Au collisions as a function of eta and pt
  - electron PID efficiency (fixed to 70% and90%)
  - hadron rejection factors

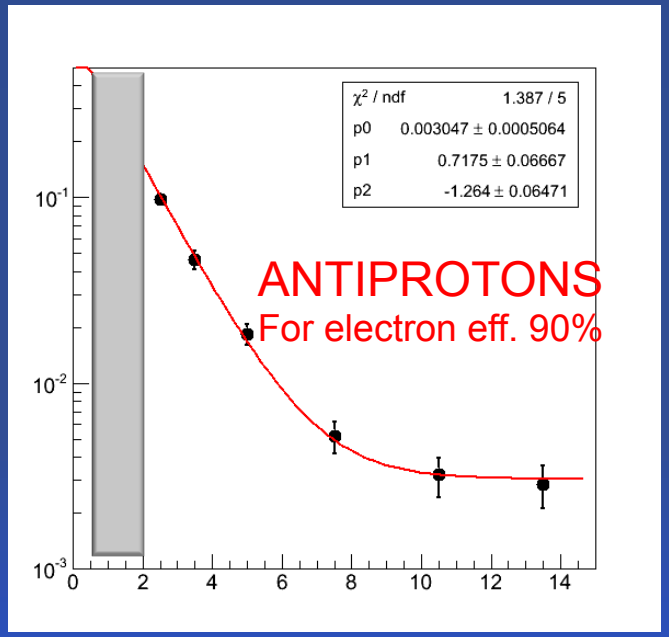
In progress

- ✓Determine correlated background (bottom, charm semileptonic decays and DY) -

Hadron Rejection

- In the past we assumed a fixed hadron rejection factor of 90
- New hadron rejection factors were calculated embedding of single particles in central (0-4.4fm) Hijing events and running full reconstruction chain.





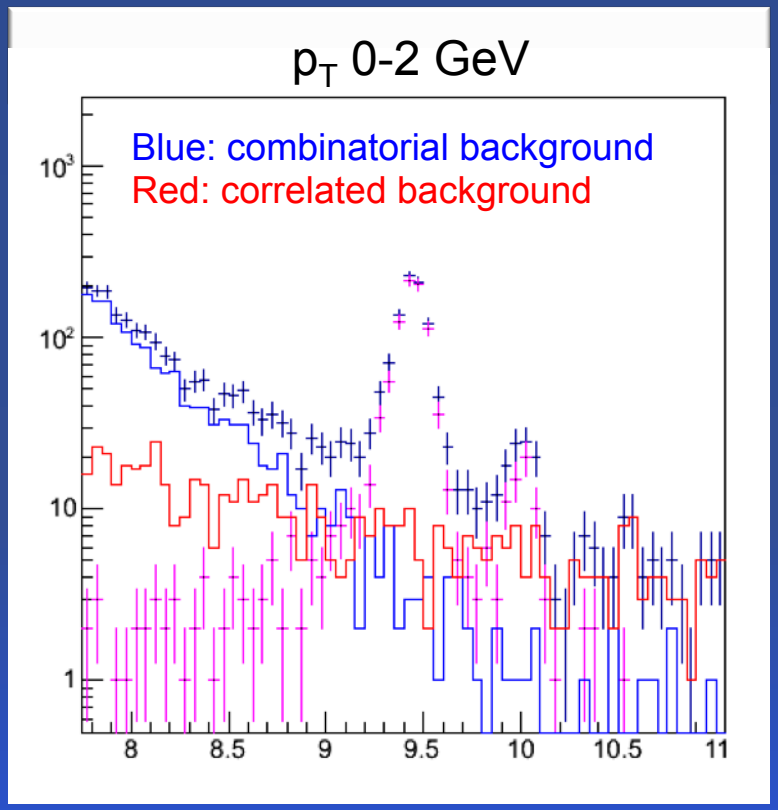
proton and kaon rejections are better than that for pions

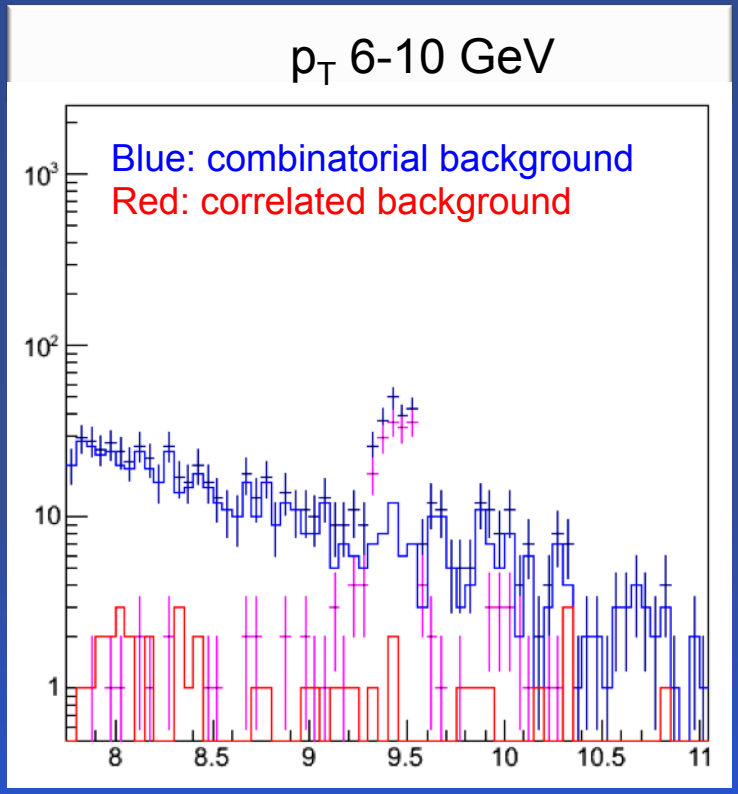
Combinatorial Background

- We calculate background for 10B 0-10% central Au+Au events.We use p_T>2GeV/c cut, which does not affect Upsilons.
- Take fits to hadron spectra in p+p, scale by N_{COLL} and R_{AA}, downscale by hadron rejection.
- This gives us dN/dp_T per events for “fake electrons” in central Au+Au collisions.
- For each event, generate number of fake electrons (smeared Poisson), for each fake electron generate kinematics (p_T, etc.). Calculate invariant mass.
- Do the same for fake electron / heavy flavor combinations.

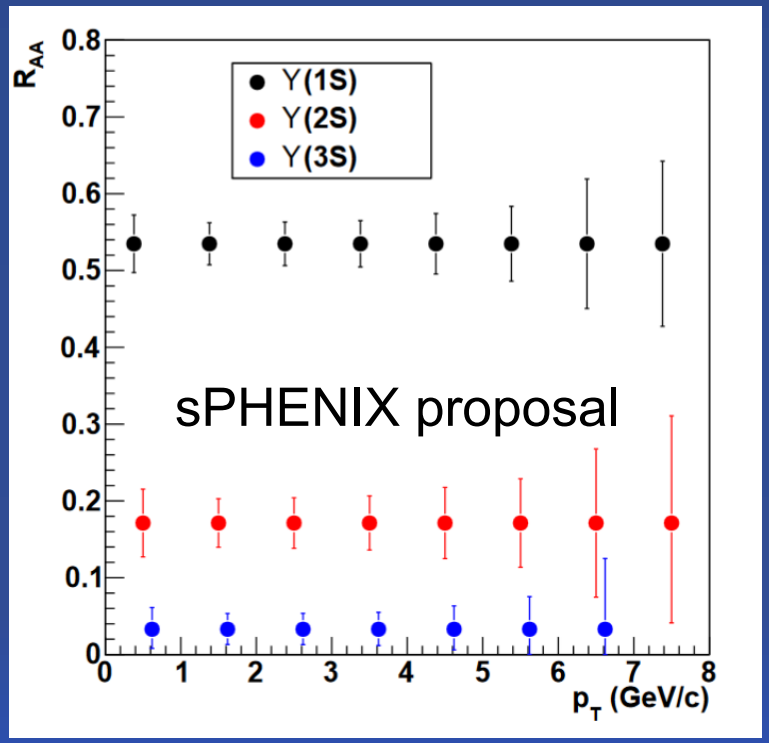
Invariant Mass

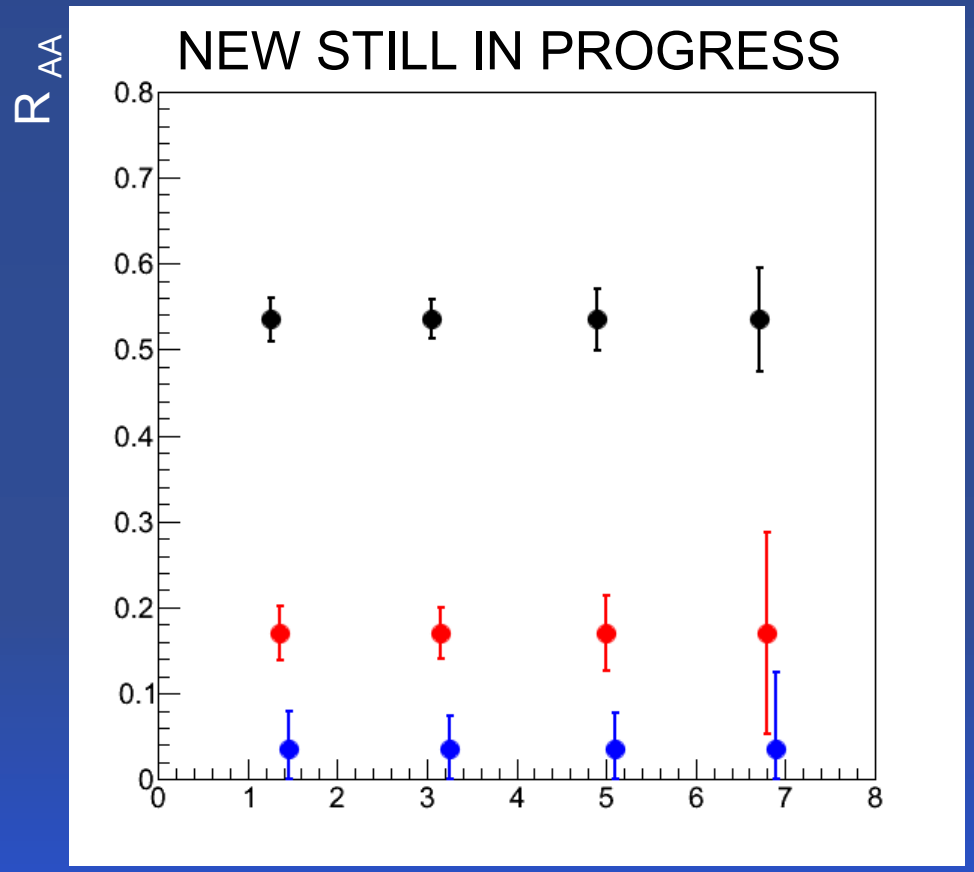
Realistic suppression, eID eff. = 70%





eID efficiency 70%
realistic suppression





Plans

- Complete the Upsilon signal extraction using Crystal Ball functions (small improvements expected in signal significance). We will need to understand better the tracking (mom resolution) performance and track quality cuts

- Verify Pythia parameters for correlated backgrounds and generated higher statistics plots for more accurate estimates of backgrounds at high pt